

Supplementary Material Excerpts from Field Notes

Included below are excerpts from field notes from Instructor Team meetings that were not audio recorded. We include excerpts from three meetings, showing examples of all categories that were present in the field notes (Correct Answers did not emerge from field notes). Thematic categories sometimes occurred in a set of field notes more than once, but we counted each theme only once per meeting and show one instance per excerpt here. The most relevant portions of the excerpts are bold-faced or italicized.

1. Thematic Category: Bloom's (bold) and Student Experience (italics), June 12, 2009

"On this meeting on the 06/12/2009, Instructor 1 and 2 and I were beginning to flesh out the specifics of what we would be looking for, what kind of skills we were talking about with these critical thinking questions, so we were trying to take it a step beyond the Bloom's categorizations to actual skills, actual things that students have to do to solve problems in a biology class. **We were informed by the Crowe et al. paper on Blooming Biology, a 2008 paper and the Bissell and Lemons paper from 2006 and also just our kind of own insights about this.**

"The first thing we did was to start making a list of specific cognitive activities or actions that students would take, so this is labeled higher order. *One of the things we said up front is that these higher order questions have to be all new situations. There has to be a new situation in it . . .* One skill we said was: **Use information, methods, concepts, themes in new situations. Another one we said was: To predict consequences and outcomes and, very highly related combined with that previous one, extend ideas to make predictions.** We came up with another one: **Solving problems, in which students must select the approach they will use.** The next one we said: **To identify the critical components of a new problem. Next is: Interpretation and selection of the best conclusion. The next is seeing patterns and organization of parts . . .**"

2. Thematic Category: Time Required (bold) and Difficulty (italics), June 25, 2009

"Another issue that came up in the meeting is the difference between difficulty and cognitive level. *What is the relationship?*

"We agreed that in the higher order cases, and this is the first time we had set this guideline, there could be some lower order questions, but more than 50% should be higher order. We were imagining every case having 7-10 questions, so we were imagining 4 or 5 questions should be higher order. **We made a note that higher order questions may take more time.**"

3. Thematic Categories: Bloom's (bold) and Difficulty (italics), August 19, 2009

"Clicker question #4: We judged this **higher order because we felt like they were having to break down the problem into its parts.** *We felt like the way this question read, it was quite confusing, so that can be a problem. A higher order question is not a confusing question or a poorly worded question, so you don't want the difficulty to be for a student to try and decipher exactly what you're saying, so we edited it to add clarity.*"